CENTRAL TEXAS COLLEGE  
SYLLABUS FOR CPMT 2445  
COMPUTER SYSTEM TROUBLESHOOTING

Semester Hours Credit: 4

Instructor: __________________________

Office Hours: ________________________

I.  INTRODUCTION

This has, as its sole purpose, the goal of instilling in the student a logical and automatic system of digital troubleshooting. Successful digital troubleshooting must be composed of two items: A sufficient knowledge of how the circuitry is supposed to work and a logical thought and measurement process which will lead eventually to the specific problem. This thought and measurement process is composed of two basic steps: Analyze the system to locate the defective circuit, and then troubleshoot the circuit to isolate the defective component. As always seems to be the case in the real world, there are occasional “practical” exceptions to this procedure. However, the rules and procedures, once learned, can be modified when one has enough experience to confidently and gainfully do so. Successful completion and sincere attention to this course will help the student in his career as a technician regardless of his particular specialty. Prerequisite: CPMT 1445.

II.  LEARNING OUTCOMES

Upon successful completion of this course, Computer System Troubleshooting, the student will be able to:

A.  Explain the methods used in troubleshooting digital systems. (F6)

B.  Explain the methods used in troubleshooting individual electronic circuits and systems. (F6)

C.  Find a defective part in a PC in a class period using the troubleshooting techniques outlined in one of the class text. (F7,F8,F9,F10,F12)

III.  INSTRUCTIONAL MATERIALS

A.  The instructional materials identified for this course are viewable through www.ctcd.edu/books

July 17, 2006
B. Equipment List: (Provided by Department)

1. Logic Analyzer
2. Dual-Trace Oscilloscope with Probe
3. Digital Frequency Counter
4. Digital Voltmeter
5. Microcomputer Systems

IV. COURSE REQUIREMENTS

A. This course will require serious and intense effort on the part of the student. It is suggested that the student review not only his notes from CPMT 1445, but also the service manual and logic diagram on his assigned machine.

B. Students are to keep accurate records as to amount of time required to complete the projects, the material used in the repair of each project and the cost of those materials. In giving ordering information, the student should expend every effort to obtain the best possible price. The student technician must act as the representative for the repair group to the customer whose equipment is being repaired. He/she is to maintain a proper attitude (pleasant) and that of one that is willing to provide satisfactory service regardless.

C. The student should make sure that the internal systems of the computer being serviced are understood well enough that the object can be repaired, and that its operation can be explained to the customer if necessary.

D. The oral presentations must be: (1) A thorough explanation of the operation of the diagnostic package selected by the student. The presentation must be a computer based presentation involving full multi-media. However, the largest portion of the presentation must be given by the student. (2) A comprehensive vendor and supply list to build a Dream Computer.

E. Regular attendance is mandatory, and maintenance on down equipment must be performed in a timely manner, usually within 24 hours.

V. EXAMINATIONS

There will be a computer based exam on each unit of the curriculum as well as a comprehensive exam at the end of the semester.
VI. SEMESTER GRADE COMPUTATIONS

<table>
<thead>
<tr>
<th>Course</th>
<th>Points</th>
<th>Score Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter Exams</td>
<td>400</td>
<td>1000 - 900 = A</td>
</tr>
<tr>
<td>Engineering Journal</td>
<td>100</td>
<td>899 - 800 = B</td>
</tr>
<tr>
<td>Lab Exercise</td>
<td>100</td>
<td>799 - 700 = C</td>
</tr>
<tr>
<td>Microcomputer Construction &amp; Report</td>
<td>100</td>
<td>699 - 600 = D</td>
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<tr>
<td>Oral Reports</td>
<td>100</td>
<td>599 - 0 = F</td>
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<tr>
<td>Final Exam</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>1000</td>
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</tr>
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VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM COURSE INSTRUCTOR

A. **Withdrawal from Course:** It is the student’s responsibility to officially drop a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal. The withdrawal form must be signed by the student.

Application for Withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16-week fall and spring semesters. The deadline for sessions of other lengths is as follows:

- **11-Week Session:** Friday of the 8th week
- **8-Week Session:** Friday of the 6th week
- **5-Week Session:** Friday of the 4th week

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

Students who officially withdraw will be awarded the grade of “W”, provided the student’s attendance and academic performance are satisfactory at the time of official withdrawal. Students must file an Application for Withdrawal with the College before they may be considered for withdrawal.

A student may not withdraw from a class for which the instructor has previously issued the student a grade of “F” or “FN” for nonattendance.

B. **An Administrative Withdrawal:** An administrative withdrawal may be initiated when the student fails to meet College attendance requirements. The instructor will assign the appropriate grade on the Administrative Withdrawal Form for submission to the registrar.

C. **An Incomplete Grade:** The College catalog states, an incomplete grade may be given in those cases where the student has completed the majority of the course work, but because of personal illness death in the immediate family, or military orders, the
student is unable to complete the requirements for a course. Prior approval from the instructor is required before the grade of “IP” is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an “F” for the course.

D. Cellular Phones and Beepers: Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

E. Americans with Disabilities Act (ADA): Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at www.ctcd.edu/disability-support for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

F. Instructor Discretion: The instructor reserves the right of final decision in course requirements.

G. Civility: Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

VIII. COURSE OUTLINE

A. Unit One: Operating System Fundamentals

1. Unit Objectives: Upon successful completion of this unit, the student will be able to use:

   a. Operating system basics
   b. Microsoft Windows
   c. UNIX and Linux on the desktop
   d. Network operating systems
   e. Use the Internet to locate Parts in the design of a computer.

2. Learning Activities:

   a. Read Chapter One of test book, pages 3-49(C5,F5,F10,F11,F12)
   b. Complete Chapter One in Engineering Manual (F13)
   c. Give an oral PP presentation on the building of a computer. (C1, C2, C3, C5, C6, C18, C19, F6,)
d. Perform those exercises listed in the following Worksheet pages

e. Complete Chapter One Worksheets in Lab Manual (F13)

   (1) Worksheet 1.1.6 Operating System Basics
   (2) Worksheet 1.2.8 Microsoft Windows Basics
   (3) Worksheet 1.3.5 UNIX and Linux on the Desktop

B. **Unit Two: Introduction to Networking**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to explain the:

   a. Benefits of networking
   b. Types of networks
   c. Networking standards
   d. Networking protocols
   e. LAN architectures

2. **Learning Activities:**

   a. Read Chapter Two, pages 50-97. (C5,F5,F10,F11,F12)
   b. Complete Chapter Two in Engineering Manual (F13)
   c. Give an oral PP presentation and demonstration on the purpose and use of a computer diagnostic package approved by your instructor. (C1, C2, C3, C5, C6, C18, C19, F6,)
   d. Perform those exercises listed in the following Worksheet pages
   e. Complete Chapter Two Worksheets in Lab Manual (F13)

      (1) Worksheet 2.2.5 Types of Networks
      (2) Worksheet 2.3.2 The OSI Reference Model
      (3) Worksheet 2.4.4 Network Protocols

C. **Unit Three: Physical Components of a Network**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to explain the:

   a. Configuring of a network interface card
   b. Types of Topologies used
   c. Types of Media used
   d. Types of Devices used
   e. Procedure in Connecting to the Internet (WANs).

2. **Learning Activities**
a. Read Chapter Three, pages 98-153. (C5, F5, F10, F11, F12)
b. Complete Chapter Three in Engineering Manual (F13)
c. Perform those exercises listed in the following Worksheet pages
d. Complete Chapter Three Worksheets in Lab Manual (F13)

(1) Worksheet 3.2.7 Network Topologies
(2) Worksheet 3.3.3 Twisted Pair Cabling
(3) Worksheet 3.3.5 Physical Media Types
(4) Worksheet 3.4.3 Network Devices

D. Unit Four: TCP/IP Networking

1. Unit Objective: Upon successful completion of this unit, the student will be able to explain the:

   a. History of TCP/IP
   b. IP addressing
   c. Name resolution
   d. TCP/IP protocols

2. Learning Activities:

   a. Read Chapter Four, pages 154-201. (C5, F5, F10, F11, F12)
   b. Complete Chapter Four in Engineering Manual (F13)
   c. Perform those exercises listed in the following Worksheet pages(C8, C11, C16, C18, C19, C20)
   d. Complete Chapter Four Worksheets in Lab Manual (F13)

   (1) Worksheet 4.1.2 The TCP/IP Network Model
   (2) Worksheet 4.2.2 IPv4 Addressing Overview
   (3) Worksheet 4.2.8 Subnetting

E. Unit Five: Overview of Network Services

1. Unit Objective: Upon successful completion of this unit, the student will be able to:

   a. Program a Router for Network services
   b. Remove administration and access services on a Router
   c. Program Directory services on a Router
   d. Program Other NOS services on a Router
2. **Learning Activities**

   a. Read Chapter Five, pages 202-261. (C5, F5, F10, F11, F12)
   b. Complete Chapter Five in Engineering Manual (F13)
   c. Perform those exercises listed in the following Worksheet pages (C8, C11, C16, C18, C19, C20)
   c. Complete Chapter Five Worksheets in Lab Manual (F13)

   (1) Worksheet 5.1.1 Network/NOS Services
   (2) Worksheet 5.3.3 Windows 2000 Active Directory
   (3) Worksheet 5.3.4 Novell NDS
   (4) Lab 5.3.5 Configuring Linux as a NIS Client

F. **Unit Six: Introduction to Network Operating Systems**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to:

   a. Describe the Characteristics of a network operating system
   b. Install Windows NT/2000
   c. Install Linux
   d. Determine software requirements for a Linux NOS.

2. **Learning Activities:**

   a. Read Chapter Six, pages 262-303. (C5, F5, F10, F11, F12)
   b. Complete Chapter Six in Engineering Manual (F13)
   c. Perform those exercises listed in the following Worksheet pages (C18, F10)
   c. Complete Chapter Six Worksheets in Lab Manual (F13)

   (1) Worksheet 6.1.6 Characteristics of a Network Operating System
   (2) Worksheet 6.2.4 Windows NT/2000
   (3) Worksheet 6.3.4 Linux

G. **Unit Seven: Installation and Boot Process Overview**

1. **Unit Objectives:** Upon successful completion of this unit, the student will be able to:

   a. Prepare a computer for the installation
   b. Verifying the network
   c. Complete the installation process
   d. Analyze the boot process
e. Troubleshooting NOS installation

2. Learning Activities:

   a. Read Chapter Seven, pages 304-359. (C5, F5, F10, F11, F12)
   b. Complete Chapter Seven in Engineering Manual (F13)
   c. Perform all exercises listed in the following Worksheet pages (C11, C13, C15, C16, F8, F9, F10, F12)
   d. Complete Chapter Seven Worksheets in Lab Manual (F13)

       (1) Worksheet 7.1.3 Planning the Installation
       (2) Worksheet 7.1.4 Server Components
       (3) Worksheet 7.1.5 Hardware Requirements
       (4) Worksheet 7.1.8 File Systems
       (5) Lab 7.2.6 Adding Swap File Space in a Linux System
       (6) Worksheet 7.3.5.1 The Boot Process
       (7) Worksheet 7.3.5.2 Linux Boot Process

H. Unit Eight: Windows 2000 Professional

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:

   a. Perform an installation
   b. Configure administrator/user interface
   c. Set up user accounts
   d. Managing the file system
   e. Perform needed services

2. Learning Activities:

   a. Read Chapter Eight, pages 359-399. (C5, F5, F10, F11, F12)
   b. Complete Chapter Eight in Engineering Manual (F13)
   c. Perform those exercises listed in the following Worksheet pages (C8, C11, C16, C18, C19, C20)
   d. Complete Chapter Eight Worksheets in Lab Manual (F13)

       (1) Lab 8.1.1 Installation Demonstration of Windows 2000
       (2) Worksheet 8.1.1 Installing the OS
       (3) Lab 8.1.2 Configuring an IP Address and Default Gateway in Windows 2000
       (4) Lab 8.2.1 Logging on to Windows 2000
       (5) Lab 8.2.2 Using the Windows 2000 GUI
       (6) Lab 8.2.3 Using the Windows 2000 CLI
       (7) Lab 8.2.4 Navigating the Windows 2000 File System with
I. Unit Nine: Linux Installation Procedures

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
   a. Pre-installation tasks
   b. Install and configuring the Linux operating system
   c. Install and configuring X server
   d. Perform post-installation configuration and other tasks

2. Learning Activities
   a. Read Chapter Nine, pages 399-451. (C5, F5, F10, F11, F12)
   b. Complete Chapter Nine in Engineering Manual (F13)
   c. Perform those exercises listed in the following Worksheet pages(C8, C11, C16, C18, C19, C20)
   c. Complete Chapter Nine Worksheets in Lab Manual (F13)

   (1) Lab 9.2.1 Installation of Linux
   (2) Lab 9.2.3 Configuring Network Settings
   (3) Lab 9.3.3 Configuring X Server
   (4) Lab 93431 Post-Installation of Applications and Programs

J. Unit Ten: Linux

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
   a. User interface administration
   b. User accounts and group accounts
   c. File system and services management
   d. File system configuration files
e. Documenting a Linux system configuration
f. Daemons

2. Learning Activities

a. Read Chapter Ten, pages 452-517. (C5, F5, F10, F11, F12)
b. Complete Chapter Ten in Engineering Manual (F13)
c. Perform those exercises listed in the following Worksheet pages (C8, C11, C16, C18, C19, C20)
d. Complete Chapter Ten Worksheets in Lab Manual (F13)

(1) Lab 10.1.1 Logging In to Linux
(2) Lab 10.1.2 Using the Linux GUI (X Window)
(3) Lab 10.1.3 CLI Interface
(4) Lab 10.1.4 Linux Bash and C Shells
(5) Worksheet 10.1.4 Linux Shells
(6) Lab 10.1.5 Using the Linux vi Editor
(7) Worksheet 10.1.5 vi Editor
(8) Lab 10.2.1 Adding Users in Linux
(9) Lab 10.2.3 Creating Groups in Linux
(10) Lab 10.3.1 Creating Directories in Linux
(11) Lab 10.3.5 Managing Run Levels
(12) Lab 10.4.2 HTTP Apache Web Server
(13) Lab 10.4.3 Configuring FTP Services in Linux
(14) Lab 10.4.4 Configuring Telnet in Linux
(15) Lab 10.4.5 Creating a Samba Server
(16) Lab 10.4.6 Writing a Script File in Linux

K. Unit Eleven: Advanced NOS Administration

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:

a. Performing backups to ensure data security
b. Sharing resources by mapping drives on the network
c. Using Linux utilities to manage partitions and file systems
d. Monitoring resources on network servers.
e. Analyzing and optimizing network performance
f. Network monitoring software

2. Learning Activities

a. Read Chapter Eleven, pages 518-593. (C5, F5, F10, F11, F12)
b. Complete Chapter Eleven in Engineering Manual (F13)
c. Perform those exercises listed in the following Worksheet pages (C8,
C11, C16, C18, C19, C20)

Complete Chapter Eleven Worksheets in Lab Manual (F13)

1. Worksheet 11.1.1 Overview of Backup Methods
2. Worksheet 11.1.3 Types of Backup Hardware
3. Worksheet 11.1.4 Environmental Guidelines for a Server Room
4. Lab 11.1.5a Backing Up with Windows 2000
5. Lab 11.1.5b Backing Up with Linux
6. Worksheet 11.2.4 Drive Mapping
7. Lab 11.4.5 Checking Resource Usage on Windows 2000
8. 11.4.6 Checking Resource Usage in Linux
9. Worksheet 11.5.2 Bottlenecks
10. Worksheet 11.5.3 Baseline
11. Worksheet 11.5.8 SNMP
12. Lab 11.5.10 Installing SNMP
13. ‘Lab 11.5.11 Configuring SNMP Security and Traps

L. Unit Twelve: Installing and Maintaining Hardware in a Linux Environment

1. Unit Objectives: Upon successful completion of this unit, the student will be able to:
   a. Hardware terms, concepts, and components
   b. Hardware installation, configuration, and maintenance in a Linux system
   c. Checking and confirming hardware configuration in a Linux system
   d. Diagnosing and troubleshooting devices in a Linux system
   e. Installing and using Linux with laptop and mobile devices

2. Learning Activities
   a. Read Chapter Twelve, pages 594-651. (C5, F5, F10, F11, F12)
   b. Complete Chapter Twelve in Engineering Manual (F13)
   c. Perform those exercises listed in the following Worksheet pages(C8, C11, C16, C18, C19, C20)
   d. Complete Chapter Twelve Worksheets in Lab Manual (F13)

   1 Lab 12.1.4 Using Device Manager in Windows 2000 Server
   2 Lab 12.1.5 Using the HCL
   3 Lab 12.2.3 Updating Your Server’s Operating System and Hardware

M. Unit Thirteen: Troubleshooting the Operating System

CPMT 2445
1. **Unit Objective:** Upon successful completion of this unit, the student will be able to:
   
a. Identifying and locating symptoms and problems  
b. Using system utilities and system status tools  
c. Unresponsive programs and processes  
d. Examining log files  
e. Troubleshooting problems based on user feedback  
f. Troubleshooting LILO boot errors  
g. Recognizing common errors  
h. Troubleshooting network problems  
i. Disaster recovery

2. **Learning Activities**

   a. Read Chapter Thirteen, pages 652-717. (C5, F5, F10, F11, F12)  
   b. Complete Chapter Thirteen in Engineering Manual (F13)  
   c. Perform those exercises listed in the following Worksheet pages (C8, C11, C16, C18, C19, C20)  
   c. Complete Chapter Thirteen Worksheets in Lab Manual (F13)

   (1) Worksheet 13.4.2 Using TCP/IP Utilities  
   (2) Worksheet 13.4.4 Windows 2000 Diagnostic Tools  
   (3) Worksheet 13.4.7 Server Shutdown  
   (4) Worksheet 13.5.5 Redundancy  
   (5) Worksheet 13.5.6 Hot Swapping

N. **Unit Fourteen:** Network Security

1. **Unit Objective:** Upon successful completion of this unit, the student will be able to:

   a. Developing a network security policy  
   b. Preventing threats to network security  
   c. Implementing security measures  
   d. Downloading updates, fixes, and patches for a network operating system  
   e. Understanding how to configure and where to place a firewall

2. **Learning Activities**

   a. Read Chapter Fourteen, pages 718-761. (C5, F5, F10, F11, F12)  
   b. Complete Chapter Fourteen in Engineering Manual (F13)  
   c. Perform those exercises listed in the following Worksheet pages (C8, C11, C16, C18, C19, C20)
c. Complete Chapter Fourteen Worksheets in Lab Manual (F13)

(1) Lab 14.1.8 Security Checklist
(2) Worksheet 14.1.9 Anti-Theft Devices for Hardware
(3) Worksheet 14.2.7 Threats to Network Security
(4) Implementing Security Measures